REMARKS

In the Office Action, Claims 1-4 and 7-10 under 35 U.S.C. §§ 102(b), 102(e), and/or 103(a); and Claims 1-10 under 35 U.S.C. § 112, second paragraph. Claim 1 has been amended; claims 11-17 have been newly added; and claims 4-10 have been cancelled. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with Markings to Show Changes Made.**" Applicants respectfully submit that the rejections have been overcome in view of the amendments and for the reasons set forth below.

In the Office Action, Claims 1-4 and 7-10 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative under 35 U.S.C. § 103(a) as obvious over European Patent Application EP 762,522 (*Tamaki*); and Claims 1-4 and 7-10 are rejected under 35 U.S.C § 102(e) as anticipated by or, in the alternative under 35 U.S.C. § 103(a) as obvious over United States Patent No. 6,156,457 (*Takami*). Thus, the Patent Office relies on *Tamaki* or *Takami* in support of the prior art rejections.

"Under 35 U.S.C. § 102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art ..." *Akzo NV v. U.S. International Trade Commission*, 1 U.S.P.Q.2d 1241, 1245 (Fed. Cir. 1986). The Court of Appeals for the Federal Circuit has held that "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a *single* prior art reference." *Verdegaal Bros v. Union Oil of California*, 814 F.2d 628, 631 (Fed. Cir. 1988) (*emphasis added*).

Under 35 U.S.C. § 103, the Patent Office has the initial burden of proving a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 23 U.S.P.Q.2d 1780, 1783-84 (Fed. Cir. 1992).

At the outset, claims 4-10 have been cancelled, thus rendering the prior art rejections moot with respect to same. In place of claims 4-10, claims 11-17 have been newly added. Applicants believe that no new matter has been added.

Of the pending claims, claim 1 and newly added claims 11-13 and 16 are the sole independent claims. Claim 1 has been amended as previously discussed. Applicants believe that no new matter has been added. Newly amended claim 1 recites a graphite powder formed by

graphitization at a temperature ranging from about 1500°C to less than 2200°C. The graphite powder includes a carbon material containing about 0.01 to less than 1.0 wt% of boron and having a looped closure structure at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing, wherein the density of the interstitial planar sections between neighboring closure structures is not less than 100/μm and not more than 1500/μm.

Newly added claim 11 recites a negative electrode material of a lithium ion secondary battery. The negative electrode material consisting essentially of a graphite powder formed by graphitization at a temperature ranging from about 1500°C to less than 2200°C. The graphite powder includes a carbon material containing about 0.01 to less than 1.0 wt% of boron and having a looped closure structure at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing, wherein the density of the interstitial planar sections between neighboring closure structures is not less than 100/μm and not more than 1500/μm.

Newly added claim 12 recites a lithium ion secondary battery including a negative electrode material consisting essentially of a graphite powder formed by graphitization at a temperature ranging from about 1500°C to less than 2200°C. The graphite powder includes a carbon material containing about 0.01 to less than 1.0 wt% of boron and having a looped closure structure at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing, wherein the density of the interstitial planar sections between neighboring closure structures is not less than 100/μm and not more than 1500/μm.

Newly added claim 13 recites a method for producing a graphite powder that includes about 0.01 to less than 1.0 wt% of boron. The method includes the steps of pulverizing a carbon material at least one of prior to carbonization and after carbonization; heating the carbon material at a temperature ranging from about 1500°C to less than 2200°C thereby causing graphitization of the carbon material to occur, wherein boron is added to the carbon material prior to graphitization; and forming a looped closure structure at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing, wherein a density of interstitial planar sections between neighboring closure structures is not less than 100/μm.

Newly added claim 16 recites a method for producing a graphite powder that includes about 0.01 to less than 1.0 wt% of boron. The method includes pulverizing a carbon material at least one of prior to carbonization and after carbonization; heating the carbon material at a temperature ranging from about 1500°C to less than 2200°C thereby causing graphitization of

the carbon material to occur, wherein boron is added to the carbon material prior to graphitization; heating the carbon material thereby causing scraping of a surface of the graphite powder; heating the carbon material in an inert gas at a temperature not less than 800°C; and forming a looped closure structure at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing, wherein a density of interstitial planar sections between neighboring closure structures is not less than 100/μm.

Applicants have uniquely discovered that the graphite powders of the present invention exhibit high crystallinity and high density of the interstitial planar section of the looped closure structure without having to utilize special, expensive materials to manufacture same. Further, Applicants have shown that by employing the graphite powders of the present invention as a negative electrode material of a lithium ion secondary battery, it is possible to realize a high discharging capacity that can exceed 350 mAh/g. *See,* Specification, page 17. This is clearly supported by the experimental tests and results thereof conducted by Applicants beginning on page 43 of the Specification and summarized, for example, in Table 1, on page 48.

In contrast, Applicants believe that the cited art does not appear to disclose or suggest a number of the graphite powder features of the claimed invention. For example, nowhere does the cited art suggest that the density of interstitial planar sections, let alone that the specific density features of the claimed invention, can have a desirable effect on the discharge capacity as Applicants have demonstrated, for example, on page 48, Table 1. Nor does this feature appear to be inherent based on the purported teachings of the cited art.

Further, the *Tamaki* reference fails to disclose or suggest the graphitization temperature feature of the claimed invention. *Tamaki* merely discloses it is preferred that the graphitization be conducted in the presence of a boric compound at 2200°C or higher, especially, 2400°C or higher and, still especially 2400°C to 3100°C. See, *Tamaki*, page 9, lines 7-19. Indeed, Applicants have demonstrated that effective graphitization can occur at lower temperatures (e.g., less than 2200°C) in the presence of a boron compound. See, Applicants' Specification, for example, Table 4, page 61.

With respect to *Takami*, this reference fails to disclose or suggest the amount of boron as required by the claimed invention. In this regard, *Takami* merely discloses that the carbon material includes 1 wt% to 10 wt% of boron. See, *Takami*, for example, col. 3, lines 10-16. Indeed, Applicants have demonstrated that graphite powders with less than 1 wt% of boron can

display desirable discharge capacity and charging/discharging efficiency during use. See, Applicants' Specification, for example, Table 4, page 61.

Further, nowhere does the cited art disclose or suggest the method for producing the graphite powders as required by the claimed invention. The present invention provides producing graphite powders that contain about 0.01 to less than 1.0 wt% of boron. The graphite powders, as produced, have a looped closure structure with specific characteristics, as claimed, allowing the graphite powders to be effectively utilized, for example, to enhance discharge/charge capacity and extend discharge/charge duration as applied. The graphite powders can be made by pulverizing a carbon material before and/or after carbonization. See, Specification, pages 27-32. The carbon material is then subject to heat treatment at an effective temperature as claimed for graphitization to occur thereby forming a looped closure structure with the desirable properties as required by the claimed invention. See, Specification, page 33.

Further, the looped closure structure, thus formed, can be further processed by scraping a surface of the graphite powder thereby opening the looped closure structure. This can be conducted via oxidizing heat treatment. See, Specification, page 33-36. If then the graphite powders are heat treated in an inert gas atmosphere, the terminal ends of the open structure of the carbon network layer can be connected to the terminal end of the other carbon network layer in a loop to form, again, a looped closure structure on the surface of the graphite powders. The additional processing steps can increase the density of the interstitial planar sections, thus enhancing the desirable properties of the graphite powders of the claimed invention. See, Specification, pages 36-37.

Based on at least these differences, Applicants believe that the cited art is clearly deficient with respect to the claimed invention. Therefore, Applicants respectfully submit that the cited art, alone or even if combinable, fail to anticipate or render obvious the claimed invention.

Accordingly, Applicants respectfully request that the anticipation and obviousness rejections be withdrawn.

In the Office Action, Claims 1-10 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter of the claimed invention. In response, claim 1 has been amended as suggested by the Patent Office. Applicants note for the record that these changes to claim 1 were made for clarification purposes

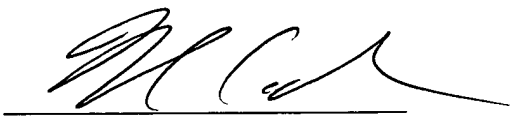
and, thus have no narrowing effect on the scope of the claimed subject matter. Therefore, Applicants respectfully submit that the claimed invention fully complies with 35 U.S.C. § 112.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

For the foregoing reasons, Applicants submit that the present application is now in condition for allowance and earnestly solicit reconsideration of same.

Respectfully submitted,

BELL, BOYD & LLOYD LLC

BY 

Thomas C. Basso
Reg. No. 46,541
P.O. Box 1135
Chicago, Illinois 60690-1135
Phone: (312) 807-4310

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 1 has been amended as follows:

1. (Five times Amended) A graphite powder formed by graphitization at a temperature ranging from about 1500°C to less than 2200°C, the graphite powder comprising a carbon material containing about 0.01 to ~~5.0~~ wt% of boron and ~~including a surface structure selected from the group consisting of a single layered looped closure structure, a multi layered~~ having a looped closure structure~~, and combinations thereof,~~ at an end of a graphite c-planar layer on at least a surface of cleavage formed by shearing~~;~~, wherein the density of the interstitial planar sections between neighboring closure structures is not less than 100/μm and not more than 1500/μm~~; and wherein said carbon material is surface processed by scraping the surface of the graphite c-planar layer~~.

Claims 4-10 have been cancelled.

Claims 11-17 have been newly added.